

VII Semester Syllabi – Information Technology

SEMESTER VII / ODD SEM									
S. No	Course Code	Course Name	L	T	P	Credit			
1		Elective 5	3	0	0	3			
2		Elective 6	3	0	0	3			
3		Open Elective 3	3	0	0	3			
4	IT3PC01	Project: Work I	0	0	8	4			
5	IT3PC03	Industrial Training	0	2	0	2			
6	EN3MC04	Human Values & Ethics	2	0	0	0			
		<b>Total</b>	<b>11</b>	<b>2</b>	<b>8</b>	<b>15</b>			
		Total Contact Hours	<b>21</b>						

**Programme Elective 5**

S. No	Course Code	Course Name	L	T	P	Credit
1	IT3EA07	Machine Learning	3	0	0	3
2	IT3EL03	Information Storage and Management	3	0	0	3
3	IT3EI06	Cyber Ethics and Laws	3	0	0	3

**Programme Elective 6**

S. No	Course Code	Course Name	L	T	P	Credit
1	IT3EA09	Graph Theory	3	0	0	3
2	IT3EI02	Cyber Security and Forensics	3	0	0	3
3	IT3EL05	Ad-Hoc Networks	3	0	0	3

**Open Elective 3**

S. No	Course Code	Course Name	L	T	P	Credit
1	OE00053	E-Commerce	3	0	0	3
2	OE00055	Data Analytics	3	0	0	3

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Course Code	Course Name	Hours Per Week			Total
		L	T	P	Credits
CS3EA07/IT3EA07	Machine Learning	3	0	0	3

#### UNIT I

**Introduction to Machine Learning**, Applications, Classification; Supervised Learning: Linear Regression: Cost Function, Gradient Descent; Logistic Regression, Nearest-Neighbors, Gaussian Function.

#### UNIT II

Overfitting and Underfitting, Regularization, Bias and Variance, Decision Trees, Naïve Bayes; Support Vector Machines, Kernel Methods.

#### UNIT III

**Unsupervised Learning:** Clustering: K-means, Dimensionality Reduction: PCA, Matrix Factorization and Matrix Completion, Ranking, Recommender System.

#### UNIT IV

**Introduction to Neural Network**, Perceptron, Feed Forward, Back Propagation, Recurrent Neural Network. Introduction to Python Machine Learning Libraries: Keras, Tensor Flow and Theano.

#### UNIT V

Evaluating Machine Learning Algorithms and Model Selection, Ensemble Methods: Boosting, Bagging, Random Forests, Deep Learning, Semi-Supervised Learning, Reinforcement Learning.

#### Text Books:

1. Tom Mitchell, "Machine Learning", McGraw Hill.
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press.
3. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer (freely available online)

#### Reference Books:

1. Christopher Bishop, Pattern Recognition and Machine Learning, Springer.
2. Hal Daumé III, A Course in Machine Learning (freely available online)
3. Sebastian Raschka, Vahid Mirjalili, Python Machine Learning: Machine Learning and Deep Learning with Python, scikit-learn, and TensorFlow, Packt Publishing.



Course Code	Course Name	Hours Per Week			Total
		L	T	P	Credits
CS3EL03/ IT3EL03	Information Storage and Management	3	0	0	3

#### UNIT I

**Introduction to Storage Technology:** Data Proliferation, Evolution of Various Storage Technologies, Overview of Storage Infrastructure Components, Information Lifecycle Management, Data Categorization.

#### UNIT II

**Storage Systems Architecture:** Intelligent Disk Subsystems Overview, Contrast of Integrated vs Modular Arrays, Component Architecture of Intelligent Disk Subsystems, Disk Physical Structure Components, Properties, Performance and Specifications, RAID levels & Parity Algorithms, Hot Sparring, Front End to Host Storage Provisioning, Mapping and Operation.

#### UNIT III

**Introduction to Networked Storage:** JBOD, DAS, NAS, SAN & CAS Evolution and Comparison, Applications, Elements, Connectivity, Standards, Management, Security and Limitations of DAS, NAS, CAS & SAN.

#### UNIT IV

**Hybrid Storage Solutions; Virtualization:** Memory, Network, Server, Storage & Appliances. Data Center Concepts & Requirements, Backup & Disaster Recovery: Principles Managing & Monitoring; Industry Management Standards (SNMP, SMI-S, CIM), Standard Framework Applications, Key Management Metrics (Thresholds, Availability, Capacity, Security, Performance).

#### UNIT V

**Information storage on cloud:** Concept of Cloud, Cloud Computing, Storage on Cloud, Cloud Vocabulary, Architectural Framework, Cloud Benefits, Cloud Computing Evolution, Applications & Services on Cloud, Cloud Service Providers and Models, Essential Characteristics of Cloud Computing, Cloud Security and Integration.

#### Text Books:

1. G. Somasundaram & Alok Shrivastava (EMC Education Services) Editors; Information Storage and Management: Storing, Managing, and Protecting Digital Information; Wiley India.
2. Ulf Troppens, Wolfgang Mueller-Friedt, Rainer Erkens, Rainer Wolafka, Nils Haustein; Storage Network Explained: Basic and Application of Fiber Channels, SAN, NAS, iSER, INFINIBAND and FCOE, Wiley India.
3. Saurabh, Cloud Computing: Insight into New Era Infrastructure, Wiley India.

#### References:

1. John W. Rittinghouse and James F. Ransome; Cloud Computing: Implementation, Management and Security, CRC Press, Taylor Frances Pub.
2. Nick Antonopoulos, Lee Gillam; Cloud Computing: Principles, System and Application, Springer.
3. Rich Schiesser, IT Systems Management: Designing, Implementing and Managing World-class Infrastructures, PHI Learning.

Course Code	Course Name	Hours Per Week			Total
		L	T	P	Credits
CS3EI 06/IT3EI06	Cyber Ethics and Laws	3	0	0	3

#### UNIT I

Introduction, Cyber Ethics, Need of Cyber Ethics, Intellectual Property (IP), IPR Governance, The World Intellectual Property Organization (WIPO).

#### UNIT II

Cyber Space, Cyber Law, Scope of Cyber Laws: E-Commerce; Online Contracts; IPRs (Patent, Trademarks, Copyright, Industrial Design, Geographical Indication), Right to Access, Right to Privacy, Cyber Law in India with Special Reference to Information Technology Act-2000.

#### UNIT III

Introduction to Computer and Cyber Crimes, Conventional Crimes, Identity Theft and Fraud, Cyber Terrorism, Cyber Defamation, Cyber Stalking, E-Commerce Frauds, Social Engineering Attacks, Cyber Pornography, Forgery and Fraud, Crime Related to IPRS.

#### UNIT IV

Cyber Jurisdiction: Introduction to Indian Evidence Act, Indian Patent Act, Introduction to Indian Penal Code, Bankers Book Evidence Act, RBI Act, Information Technology Act 2000 and Amendment in IT Act 2008.

#### UNIT V

Issues in Cyberspace, Issues Related to IPR, Issues Relating to Investigation, Domain Name Dispute, Issues Relating to Jurisdiction, Issues Relating to Evidence, Case Study, Cyber Crimes.

#### Text Books:

1. Marjie T. Britz, Computer Forensic & Cyber Crime, Pearson
2. Dr. R.K.Tiwari P.K.Sastri, K.V. Ravi Kumar, Computer Crime and Computer Forensics, First.
3. Verma SK, Mittal Raman, Legal Dimension of Cyber Space, Indian Law Institute, New Delhi.

#### Reference Books:

1. Vinod V. Sople, Managing Intellectual Property PHI Learning Private Limited.
2. Understanding Forensics in IT, PHI Learning.
3. IT Act 2000 Details [www.mit.gov.in](http://www.mit.gov.in)



Course Code	Course Name	Hours Per Week			Total
		L	T	P	Credits
IT3EA09	Graph Theory	3	0	0	3

#### UNIT I

**Introduction:** Graphs- Introduction, Isomorphism, Sub Graphs, Walks, Paths, Circuits, Connectedness, Components, Euler Graphs, Hamiltonian Paths and Circuits, Trees- Properties of Trees, Distance and Centers in Tree, Rooted and Binary Trees. Special Classes of Graphs: Bipartite Graphs, Line Graphs, Chordal Graphs.

#### UNIT II

**Spanning Trees:** Fundamental Circuits, Spanning Trees in a Weighted Graph, Cut Sets: Properties of Cut Set, All Cut Sets, Fundamental Circuits and Cut Sets, Connectivity and Separability, Network Flows, 1-Isomorphism, 2-Isomorphism, Combinational and Geometric Graphs, Planer Graphs, Different Representation of a Planer Graph.

#### UNIT III

Chromatic Number, Chromatic Partitioning, Chromatic Polynomial, Matching, Covering, Greedy Coloring Algorithm, Four Color Problem, Directed Graphs -Types of Directed Graphs, Digraphs and Binary Relations, Directed Paths and Connectedness, Euler Graphs.

#### UNIT IV

Fundamental Principles of Counting, Permutations and Combinations, Binomial Theorem, Combinations with Repetition, Combinatorial Numbers, Principle of Inclusion and Exclusion, Derangement.

#### UNIT V

Generating Functions, Partitions of Integers, Exponential Generating Function, Summation Operator, Recurrence Relations, First Order and Second Order, Non-homogeneous Recurrence Relations, Method of Generating Functions.

#### Text Books:

1. Narsingh Dco, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.
2. Grimaldi R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", Addison Wesley, 1994.
3. Clark J. And Holton D.A, "A First Look at Graph Theory", Allied Publishers, 1995.

#### Reference Books:

1. Mott J.L., Kandel A. And Baker T.P. "Discrete Mathematics for Computer Scientists and Mathematicians", Prentice Hall of India, 1996.
2. Liu C.L., "Elements of Discrete Mathematics", Mc Graw Hill, 1985.
3. Rosen K.J.L, "Discrete Mathematics and Its Applications", Mc Graw Hill, 2007.

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Course Code	Course Name	Hours Per Week			Total
		L	T	P	Credits
CS3EI02 /IT3EI02	Cyber Security & Forensic	3	0	0	3

#### UNIT I

Introduction, Computer Security vs Network Security vs Cyber Security, Goals of Security, Security Concepts, Security Standard, Computer Crime, Cyber Crime, Type of Cyber Crime, Chain of Custody, Cyber Investigation.

#### UNIT II

Digital Evidence, Types of Digital Evidences, Imaging of Digital Evidences, Disk Encryption, Digital Evidence Seizure Methodology, Common Threads within Digital Evidence Seizure.

#### UNIT III

Digital Forensic & Investigation, Digital Forensics Dimensions, Applications, Tools, Principle of Digital Forensics, Investigation Models, Scientific Method in Digital Investigation, Desktop Forensic: Source of Digital Evidence, Imaging, Seizing, Recovery, Desktop Forensic Tools.

#### UNIT IV

Live Forensic: Source of Digital Evidence, Ram Dumping, and Live Forensic Tools.  
Network Forensic: Source of Digital Evidence, Network Forensic Tools.  
Mobile Forensic: Source of Mobile Evidence, SIM Forensic, Mobile Forensic Tools.

#### UNIT V

Cyber Investigative Roles, Cyber Professional Roles, Cyber Crime Prevention at Organization Level, Society Level, Business Level. Use Cases of Digital Forensic, Application of Digital Forensic.

#### Text Books:

1. Bill Nelson, Amella Phillips, Computer Forensics and Investigations, Cengage Learning.
2. Nina Godbole, Information System Security, Willey.
3. Anthony Reyes, Cybercrime Investigation, Syngress.

#### Reference Books:

1. Eoghan Casey, Digital Evidence and Computer Crime: Forensic Science, Computers and the Internet, Word Press.
2. Michael McLafferty, Warun, Levesque, Arthur Salmon, Applied Network Security, PACKT.
3. Dr. R.K.Tiwari, P.K.Sastri, K.V. Ravikumar, Computer crime and Computer Forensics, Select Publishers.





Course Code	Course Name	Hours Per Week			Total
		L	T	P	Credits
CS3EL05 / IT3EL05	Ad hoc Networks	3	0	0	3

#### UNIT I

Introduction to Ad hoc Networks, Definition, Characteristics Features, Applications, Characteristics of Wireless Channel, Architecture of Ad hoc Network.

#### UNIT II

Medium Access Protocol MAC, Design Issues, Goals, Classification, Contention Based Protocols, IEEE Standards 802.11, 802.15 and HIPERLAN.

#### UNIT III

Routing Protocols for Ad hoc Network, Design Issues, Classifications, Table Driven Routing Protocol, Destination Sequenced Distance-Vector Routing Protocol, Cluster-Head Gateway Switch Routing Protocol, On Demand Routing Protocol, Dynamic Source Routing Protocol, Ad hoc on Demand Distance Vector Routing Protocol.

#### UNIT IV

Transport Layer and Security Protocols for Ad hoc Network, Design Issues, Goals, Classifications, Security in Ad hoc Network, Issues and Challenges in Security Provisioning, Network Security Attacks.

#### UNIT V

Secure Routing in Ad hoc Network, Requirement, Security Aware Ad hoc Routing Protocols Introduction to Wireless Sensor Network, Applications of Sensor Network, Comparison with Ad hoc Wireless Network.

#### Text Books:

1. C. Siva Ram, Murthy and B.S, Manoj, Ad Hoc Wireless Networks Architectures and Protocols, Prentice Hall
2. Charles E. Perkins, "Ad hoc Networking," Addison-Wesley
3. Holger Karl and Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, Wiley

#### Reference Books:

1. Carlos de Morais Cordeiro and Dharma Agrawal, Ad Hoc and Sensor Networks: Theory and Applications, World Scientific
2. Mohammad Ilyas, The Handbook of Ad hoc Wireless Networks, CRC Press
3. C.K. Toh, Adhoc Mobile Wireless Protocol: Protocols and Systems, Pearson

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Course Code	Course Name	Hours Per Week			Total
		L	T	P	Credits
OE00053	E-Commerce	3	0	0	3

#### UNIT I

**Introduction:** Electronic Commerce, Technology and Prospects, E-Commerce Organization, Architectural Framework, Model Based on Transaction Type and Transaction Party: B2B, B2C, C2B, C2C, E-Commerce, Advantages and Disadvantages, Limitations & Scope and Strategy.

#### UNIT II

**Emerging Issues and Implementation Issues:** E-Commerce Law, Govt. Policies and Agenda. Electronic Payment Systems: Credit Cards, Debit Cards, Smart Cards, e-credit accounts, e-money, Marketing on the Web, Marketing Strategies, Advertising on the Web, Customer Service and Support.

#### UNIT III

**Introduction to M-Commerce and E-Governance:** E-Government, Issues in e-governance Applications, Evolution, its Scope and Content, Benefits and Reasons e-governance, e-governance Models- Broadcasting, Critical Flow, Comparative Analysis, Mobilization and Lobbying, Interactive Services/G2C2G.

#### UNIT IV

E-Readiness, E-Government Readiness, E-Framework, Step & Issues, Application of Data Warehousing and Data Mining in E-Government, Case Studies: NICNET-Role of Nationwide Networking in E-Governance, E-Seva.

#### UNIT V

**E-Government Systems Security:** Challenges and Approach to E-Government Security, Security Concern in E-Commerce, E-Payment Security, Security for Server Computers and Client Computers, Communication Channel Security.

#### Text Books:

1. Gary P. Schneider, "E-Commerce", Cengage Learning India
2. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
3. C. S. R. Prabhu, "E-Governance: Concept and Case Study", PHI Learning Private Limited.

#### Reference Books:

1. K.K. Bajaj, D. Nag "E-Commerce, McGraw-Hill Education.
2. J. Satyanarayan, "E-Government, the science of the possible", PHI Learning Private Limited.
3. Efraim Turban, Jae Lee "Electronic Commerce- A Managerial and Social Network Perspective", Springer



Course Code	Course Name	Hours Per Week			Total
		L	T	P	Credits
OE00055	Data Analytics	3	0	0	3

#### UNIT I

**Introduction to Predictive Analytics:** Introduction to Analytics, Predictive analytics– Predictive Analytics Vs Business Intelligence, Predictive analytics Vs Statistics, Predictive analytics Vs Data Mining, Challenges in Predictive analytics.

#### UNIT II

**Exploratory Data Analysis:** Measures of central tendency, Measures of location of dispersions, Single Variable summary, Data Visualization in one dimension and two dimensions, Skewness, Kurtosis, Rank-Ordered Statistics.

#### UNIT III

**Data Preparation:** Variable Cleaning, Feature Creation, Simple Variable Transformations, Nominal and Ordinal Variable Transformations, Multidimensional Features.

#### UNIT IV

**Descriptive Modeling:** Data Preparation Issues, Principal Component Analysis- PCA Algorithm, PCA for data interpretation, Factor Analysis, Effect of Variable Magnitude on PCA models.

#### UNIT V

**Statistical Analysis:** Univariate Statistical Analysis: Estimate, prediction and inference, Confidence interval and hypothesis testing, T-test for difference in mean, Z-test for difference in proportion.

#### Text Books:

1. Dean Abott, Applied Predictive Analytics: Principles and Techniques for the Professional Data Analyst, Wiley Publication
2. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, Probability & Statistics for Engineers & Scientists, Prentice Hall Inc
3. Tom White, Hadoop: The Definitive Guide, O'Reilly.

#### Reference Books:

1. Daniel T. Larose, Chantal D. Larose, Data Mining and Predictive Analytics.
2. John M. Chambers, Software for Data Analysis: Programming with R (Statistics and Computing), Springer
3. John D Kelleher, Brian Mac Namee, Aoife D Arcy, Fundamentals of Machine Learning for Predictive Data Analytics: Algorithms, Worked Examples, and Case Studies, Kindle Edition.

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Course Code	Course Name	Hours Per Week			Total
		L	T	P	Credits
IT3PC03	Industrial Training	0	2	0	2

Industrial training is a training program that helps students to gain experience in the professional employment world at the Industry. This program is an essential component in the curriculum of Engineering Bachelor Degrees at Medi-Caps University.

It is also essential in the stream to keep in pace with the expectations of industry. Broadly, the objectives of the course are as follows:

To motivate students to apply his knowledge to realistic and practical problems

- i. To encourage students to work in synergetic collaboration within teams
- ii. To develop professional attitude and critical thinking
- iii. To learn organizational functioning and decision making
- iv. To set a stage for future recruitments and placements for students by potential employers

**Prerequisites:** Nil

**Minimum days of Training:** 4 weeks

**Training Locations:** Industry- Student's have choice to go Industry/Company/Educational Institution of Repute of their preferences. Permission of the University is necessary before the commencement of training. In case of training is opted by the students from the options provided by University, Students will not be allowed to change.

**Procedure:**

- i. Internal and external guide from the department and the industry/ institutions respectively will be finalised within a week of commencement of training. In case of training given in University campus only the internal guide is required.
- ii. Daily log book must be maintained by the student, duly signed by the industry/ internal guide. This log book will be considered as attendance record. Student will report weekly to the departmental guide about the progress of training.
- iii. Confidential report of the student's attitude and learning in the organization should be provided by the external guide to the internal guide through mail or sealed and signed hard copy.
- iv. Student will submit Training completion certificate in the department before applying for examination.
- v. Well formatted summary of work and report is required to be submitted in the department as per the prescribed format.
- vi. The student are required to give the Presentation during the semester in which they register for the industrial training course.
- vii. Reports must be submitted during the presentation.





- viii. During end semester examination a viva voce along with written examination will be conducted. Evaluation will be based on 60 marks internal and 40 marks external total 100 (60+40).
- ix. Only industries registered and active with Ministry of Corporate Affairs will be accepted as industry for valuation of industry training.
- x. Professor incharge Training/HOD must verify the company details from [www.mca.gov.in](http://www.mca.gov.in) before granting the permission.

Note : For the session 2019-20 those who are already permitted before 31<sup>st</sup> May, 2019 to a company which is not registered with Ministry of corporate affairs will be acceptable. After this date no permission will be granted for such companies.

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